

What Is Claimed is:

1. An enhanced scanning solutions module comprising:
 - a flow control subsystem;
 - a detector subsystem coupled to said flow control subsystem;
 - a dryer/moisture separator subsystem coupled to said flow control subsystem;
 - a sampling subsystem coupled to said flow control subsystem; and
 - a software control subsystem coupled to at least one of said flow control subsystem, said detector subsystem, said dryer/moisture separator subsystem, and said sampling subsystem.
2. The enhanced scanning solutions module of claim 1, wherein said sampling subsystem comprises at least one of:
 - a sample loop;
 - an absorbent trap; and
 - a gas chromatography injection port.
3. The enhanced scanning solutions module of claim 1, further comprising at least one of:
 - an exhaust;
 - a pneumatic supply;
 - a power supply;
 - a bypass module;
 - a feedback signal; and
 - a pressure control subsystem.
4. An enhanced scanning solutions module comprising:
 - a detector subsystem;
 - a sampling subsystem; and

a software control subsystem coupled to said detector subsystem, and said sampling subsystem.

5. The enhanced scanning solutions module of claim 4, further comprising:
a dryer/moisture separator subsystem coupled to said software control subsystem.
6. The enhanced scanning solutions module of claim 4, wherein said sampling subsystem comprises at least one of:
a sample loop;
an absorbent trap; and
a gas chromatography injection port.
7. The enhanced scanning solutions module of claim 4, further comprising at least one of:
an exhaust;
a pneumatic supply;
a power supply;
a bypass module;
a feedback signal; and
a pressure control subsystem.
8. The enhanced scanning solutions module of claim 4, wherein the enhanced scanning solutions module comprises on-the-fly reconfigurability, and further comprises:
a plurality of operator-selectable modes.
9. The enhanced scanning solutions module of claim 4, wherein the enhanced scanning solutions module further comprises:
a plurality of pre-programmable operating modes that interactively reconfigures to perform any of a plurality of functions, subject to particular conditions.

10. The enhanced scanning solutions module of claim 4, wherein the enhanced scanning solutions module further comprises:

an interface between said detector subsystem and a gas handling subsystem allowing insertion of at least one of: a sample, another detector, a flowpath, a flow path rate, a dryer, an exhaust, a feedback, and a trap.

11. The enhanced scanning solutions module of claim 4, said software control subsystem comprises at least one of:

- a data logger;
- a sequencer;
- a valve control system;
- a monitor;
- a display; and
- a recording function.

12. The enhanced scanning solutions module of claim 4, further comprising a membrane interface probe apparatus comprising:

a membrane interface probe (MIP) sensor having a larger diameter than a conventional MIP sensor.

13. The enhanced scanning solutions module according to claim 12 wherein said larger diameter MIP sensor is adapted for direct coupling to larger diameter rod systems.

14. The enhanced scanning solutions module according to claim 12 wherein said larger diameter MIP sensor allows use of said MIP sensor with larger capacity push and hammer systems.

15. The enhanced scanning solutions module according to claim 12 wherein said larger diameter MIP sensor allows use in situations where a low sidewall support of the drive rod string exists.
16. The enhanced scanning solutions module according to claim 12, wherein said larger diameter MIP sensor is adapted to include two or more permeable membranes.
17. The enhanced scanning solutions module of claim 4, further comprising:
 - a membrane interface probe (MIP) sensor having two or more permeable membranes.
18. The MIP sensor of claim 17, wherein said two or more permeable membranes are arranged equidistant about a circumference of said MIP sensor.
19. The MIP sensor of claim 18, wherein said MIP sensor is operative to improve circumferential sensing and to increase likelihood of collection of volatile organic mass by said MIP sensor.
20. The enhanced scanning solutions module of claim 4, further comprising a membrane interface probe apparatus comprising:
 - a membrane interface probe (MIP) sensor adapted to improve watertight integrity by including undersea cabling electrical couplings and O-ring mechanical couplings.
21. The enhanced scanning solutions module of claim 4, further comprising a modular membrane interface probe (MIP) apparatus comprising:
 - a modular membrane interface probe (MIP) sensor constructed from a plurality of modular components allowing field serviceable replacement of any malfunctioning components of said plurality of modular components.

22. The module of claim 21, wherein the modular MIP apparatus comprises at least one of:

an external barrel having a cavity; and

an inner core barrel assembly field-insertable into said cavity having a heater cavity, wherein said heater cavity is adapted to receive a field-insertable removable cartridge heating element.

23. The module of claim 21, wherein the modular MIP apparatus comprises a removable conductivity nose assembly.

24. The module of claim 21, wherein the modular MIP apparatus comprises a field-insertable removable cartridge heating element.

25. The module of claim 21, wherein the modular MIP apparatus comprises at least one of a waterproof electrical connector and an O-ring seal.

26. The module of claim 4, further comprising a membrane interface probe apparatus comprising:

a membrane interface probe (MIP) sensor comprising a removable trap directly into the probe for the collection and concentration of volatile organic compounds.

27. The module of claim 26, wherein the MIP apparatus, wherein said removable trap enables detection of lower levels of concentration of said volatile organic compound, and specific identification of compounds through post run chromatographic analysis.

28. The module of claim 26, wherein the MIP apparatus, further comprises: providing for calibration of said MIP sensor using chromatographic methods.

29. The module of claim 26, wherein the MIP apparatus further comprises means for simultaneous trapping and concentrating of volatile organic compounds during MIP sampling and logging events.

30. The module of claim 4, further comprising a membrane interface probe apparatus comprising:

a membrane interface probe (MIP) sensor comprising a heated transfer line from a body of said MIP sensor to a surface detector suite minimizing loss of volatile organic compounds in a cold transfer line.

31. The module of claim 4, wherein said enhanced scanning solutions module, further comprises: a sample introduction system adapted to reduce overall equipment footprint and cost; to introduce calibration gases; and to allow for simultaneous sampling of volatile organic gas stream for immediate chromatographic analysis.

32. The module of claim 4, further comprising a membrane interface probe apparatus comprising:

a global positioning system (GPS) receiver integrated with a data acquisition system adapted to allow simultaneous geo-referencing of sampling points with sample data.